

REMARKS

Claim 1 has been amended to incorporate therein the subject matter of original claims 3, 4 and 7. Claim 2 has been cancelled as inconsistent with amended claim 1, and claims 3, 4 and 7 have been cancelled as redundant over amended claim 1. Claims 5, 6 and 8-12 are unchanged except for some changes in dependency needed in view of the cancellation of claims 4 and 7. Claims 13-19 are unchanged in substance but some minor changes in language have been made in certain claims for consistency with the language now used in claim 1.

Claim 20 has been amended in a manner parallel to claim 1, with consequent cancellation of claims 22, 23 and 26 for reasons exactly parallel to the cancellation of claims 3, 4 and 7. Claims 24, 25 and 27-34 are unchanged in substance but some changes in dependency have been made in view of the cancellation of claims 23 and 26, and other changes made to conform the language of the dependent claims to that now used in claim 20.

New claims 35-49 have been added to give applicants the full scope of the protection to which they consider themselves entitled. Claim 35 is similar to claim 1 but is directed to the single particle form of the invention described in Paragraph [0043] of the specification, which provides a basis for claim 35. Claims 36 and 37 are parallel to original claims 2 and 3 but depend from claim 35. Similarly, claims 38-46 are parallel to claims 11-19 but depend, directly or indirectly, from claim 35. Claim 47 is a process claim similar to claim 20 but with the same limitations to single particle displays as claim 35, and also finds basis in Paragraph [0043] of the specification. Claims 48 and 49 are parallel to claims 21 and 22 but depend from claim 47.

No new matter is introduced by any of the foregoing amendments.

Claims 1-34 are present in the application and all are rejected under 35 USC 102(e). The rejections are traversed.

Firstly, claims 1-7, 11-13, 15-24, 26, 28 and 30-34 stand rejected under 35 USC 102(e) as anticipated by Sheridan, U.S. Patent 5,731,792. This rejection is

traversed. More specifically, this rejection is traversed on the grounds that Sheridan does not disclose any particle within a suspending fluid and capable of dielectrophoretic movement to the sidewall of a cavity on application of an electric field.

The Office Action states that Sheridan teaches a dielectrophoretic display comprising a substrate having walls defining at least one cavity, Figure 1, item 10, 13, 22, the cavity having a viewing surface and a sidewall inclined to the viewing surface, Figure 3, item 18. Applicants agree with these statements, except that Sheridan describes his display as an electrocapillary display (see, for example, the title and Abstract) and for reasons which will be stated in detail below, an electrocapillary display is not the same as a dielectrophoretic display, and (a minor point) the integers 18 in Sheridan' Figures 1 and 3 are in fact electrodes (see for example column 2, lines 54-55), the sidewalls of the cavities apparently not being indicated by a reference numeral. The Office Action further states that Sheridan discloses a suspending fluid contained within the cavity, Figure 1, items 11 and 12 and again applicants agree.

However, the Office Action further states that Sheridan teaches a plurality of at least one type of particle suspended within the suspending fluid, Figure 1, item 11, and with this statement applicants respectfully disagree. Sheridan explicitly teaches that the liquid 11 is a dyed polar liquid (see, for example, column 3, line 50, column 4, line 1, and column 6, line 17) and there is no suggestion anywhere in Sheridan of any particles being present in liquid 11. It is respectfully noted that the stippling of liquids 11 and 12 in Sheridan's Figure 1, which the Examiner may have interpreted as indicating the presence of particles in these liquid, is in fact being used, in a manner conventional in monochrome patent drawings, to indicate the contrasting colors of the two liquids (see Sheridan, column 3, lines 57-59).

Finally, the Office Action states that Sheridan teaches means for applying to the substrate an electric field effective to cause dielectrophoretic movement of the particles to the sidewall of the cavity, Figure 1, item V, column 5, lines 50-67. Applicants agree that Sheridan teaches means for applying to the substrate an electric field, as

illustrated by the voltage V in Figure 1. However, applicants do not agree that this electric field causes dielectrophoretic movement of particles in the suspending fluid. As already noted, Sheridan clearly teaches that no particles are present in the fluid 11, so there can be no question of particles moving through this suspending fluid. Although Sheridan does mention that pigment particles can optionally be present as a coloring agent in suspending fluid 12 instead of a dye (see Sheridan, column 3, lines 57-59), there is no suggestion in Sheridan that such pigment particles will act as anything other than a passive coloring agent and remain passively suspended in the suspending fluid in the same manner as a dye. *A fortiori*, there is no suggestion that the particles move through the fluid to the sidewall of a cavity in the manner required by present claim 1.

Moreover, such dielectrophoretic movement of particles, which essentially separates out the particles from the suspending fluid, would prevent the Sheridan display operating in the manner which Sheridan describes. As already noted, the Sheridan display is an electrocapillary display which relies upon change in the *surface tension of a liquid* caused by an applied electric field; see the discussion of Sheridan's Figures 4 to 11 in columns 4-5. Thus, Sheridan relies upon movement of liquid induced by application of an electric field; in effect, the liquid is "pumped" from one location to another by application of the field. More specifically, as discussed in the Abstract and at column 5, line 51 to column 6, line 48 of Sheridan, the Sheridan display operates by moving the fluids 11 and 12 between the cavities 22 and 23 on the one hand and cavity 13 on the other. Figure 1 shows three complete pixels, each associated with one of the electrodes 28. The left- and right-hand pixels, in which no voltage is applied to the electrodes 28, display the color of the fluid 12, the color of the fluid 11 being hidden by the electrode 28. On the other hand, the central pixel, where voltage V is applied to the electrode 28, displays the color of the fluid 11, which is drawn in to the cavity 13 by the applied electric field. In such a display, it would make no sense for any pigment particles present in fluid 12 to move to the sidewalls of the cavity 22 or 23, since this would effectively separate the coloring particles from the fluid 12, with the result that the center pixel shown in

Figure 1 would fail to display the desired color of fluid 12 - and indeed, it is far from clear what the appearance of this pixel would be if the pigment particles were removed, thus rendering fluid 12 essentially transparent.

For the record, applicants also note that Sheridan does not describe the use of a backing member having an optical characteristic which contrasts with that of the particles, as required by all the present claims.

For the foregoing reasons, Sheridan does not anticipate any of the present claims.

Claims 1-3, 11-22 and 28-34 stand rejected under 35 USC 102(e) as anticipated by Bryning et al., U.S. Patent No. 5,582,700. This rejection is traversed. More specifically, this rejection is traversed for substantially the same reasons as the rejection based upon Sheridan, as discussed above, namely that Bryning does not disclose any fluid containing particles which undergo dielectrophoretic movement, as required by all the present claims.

Applicants agree that Bryning teaches a display (not a dielectrophoretic display for reasons discussed below) comprising a substrate having walls defining at least one cavity, the cavity having a viewing surface and a sidewall inclined to the viewing surface, and a suspending fluid contained within the cavity. However, applicants do not agree with the further statement in the Office Action that Bryning teaches "a plurality of at least one type of particle suspended within the suspending fluid, figure 1, item 26". Bryning repeatedly identifies integer 26 as a dye solubilized in the polar phase 24; see, for example, column 7, lines 1, 7 and 16, and column 8, lines 7, 49 and 50 of Bryning. Furthermore, for the avoidance of doubt, it is noted that Bryning identifies integer 32 as droplets of the polar phase 24 dispersed in the non-polar phase 28; see for example, column 7, lines 31 and 35.

Since there are no particles in polar phase 24, there is no possibility of such particles undergoing dielectrophoretic motion, as required by all the present claims, and accordingly none of the present claims are anticipated by Bryning. Also, Bryning

cannot disclose any particles contrasting with a backing member, as required by the present claims.

The 35 USC 103(a) rejection of claims 4-10 and 23-27 as unpatentable over Bryning in view of Ota, U.S. Patent No. 3,756,693, is traversed for the same reasons as the 35 USC 102(e) rejection based upon Bryning alone, as discussed above. Ota does not teach anything which cures the deficiencies in Bryning already noted.

Claims 1 and 20 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-45 of U.S. Patent No. 5,961,804. This rejection is traversed. More specifically, this rejection is traversed on the grounds that '804 does not teach or even suggest a dielectrophoretic display having particles with an optical characteristic which contrasts with the optical characteristic of a backing member, as required by all the present claims.

It does not appear that '804 describes any integer which could reasonably be characterized as a backing member, as that term is used in the present claims. *A fortiori*, it does not disclose any backing member which has an optical characteristic contrasting particles suspended in a suspending fluid, as required by the present claims. In '804, the differing optical states of the display are achieved by contrast between two different types of particles in the suspending fluid or between particles and a colored suspending fluid.

For the foregoing reasons, the rejections in the Office Action are unjustified and should be withdrawn.

A Patent Application Fee Determination Record (Form PTO/SB/06) and a Fee Transmittal, in payment of the fees for the additional claims filed in this Amendment, are filed herewith. Also, since the normal period for responding to the Office Action expired October 15, a Petition for a one-month extension of this period is filed herewith.

Reconsideration and allowance of all claims in this application is respectfully requested.

Arango et al.
Serial No. 10/687,166
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Respectfully submitted

A handwritten signature in black ink, appearing to read "David J. Cole", with a stylized flourish at the end.

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